

ities. Marsh, 1913, (5), reported it in the Panama Canal Zone and in 1919 (6), from Honduras. In the El Salvador collections it was found in Lakes Chalchuapa, Olomega, and Ahuachapan, and Pearse, 1915, (8), found it in Colombia. *Diaptomus columbiensis* Thiebaud 1914, (9), also collected in Colombia, is a synonym of *D. marshi*. So far as our present knowledge is concerned, it has a somewhat limited distribution, being confined to Guatemala on the north and Colombia on the south. While not found in all localities, it is not a rare species and in Lake Ahuachapan occurred in large numbers. Its preferred habitat is in shallow water or pools, while *D. siciloides*, as stated above, is found, in El Salvador, in deep bodies of water.

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ZOOLOGY.—*Three new pumas*.¹ E. W. NELSON and E. A. GOLDMAN, Biological Survey, U. S. Department of Agriculture.

Further study of the large American cats assigned to *Felis concolor* Linné has resulted in the segregation of three geographic races which, in addition to those recently characterized by the authors (Journ. Mamm., 10: 345-350, November 11, 1929), seem worthy of distinctive names.

Felis concolor kaibabensis, subsp. nov.

Kaibab Mountain Lion

Type.—From Powell Plateau, Grand Canyon National Park, Arizona (altitude 8,700 feet). No. 171186, ♂ adult, U. S. National Museum (Biological Survey collection), collected by J. T. Owens, April 15, 1911. X number 8432.

¹ Received April 15, 1931.

General characters.—A large, long-haired, pallid subspecies, with dark median dorsal area comparatively ill defined, the general tone, merging with less contrast than usual into that of sides of back, owing in part to a reduction of the overlying black wash present in most forms of the group; skull large, narrow, and elongated. Most closely allied to *F. c. hippolestes*, but generally paler, the dark median dorsal area less clearly defined; skull narrower. Larger than *F. c. azteca*, and differing otherwise in about the same characters as from *hippolestes*. Differing from *F. c. californica* in larger size, paler color, and relatively narrower skull. Closely resembling *F. c. browni* in color, but larger and cranial characters distinctive.

Color.—*Type:* Top of head, neck, and rather poorly defined median dorsal area to base of tail light tawny, very thinly and inconspicuously overlaid with black, the tawny element deepest along lower part of back and rump, paling gradually through cinnamon buff on sides of neck, shoulders, along flanks and on outer surfaces of limbs to pale pinkish buff on feet; lips, lower part of cheeks, chin, throat, chest, and inguinal region white; under surface of neck suffused with pinkish buff; belly overlaid on sides with pale pinkish buff, becoming whitish along median line; inner sides of limbs dull white, the drab basal color showing through; face in general buffy gray, with large whitish, supraorbital spots; blackish areas at base of vibrissae on sides of muzzle rather inconspicuous; ears blackish externally, broadly edged with gray extending also in a band across middle, thinly clad internally with white hairs; hairs around pads on feet brownish black; tail above light tawny, becoming dull pinkish buffy below to tip which is black, the black extending forward about three inches on upper side.

Skull.—Very similar to that of *F. c. hippolestes*, but narrower and relatively more elongated, less rounded in general outline as viewed from above; zygomata less widely spreading; interpterygoid fossa narrower; dentition about the same. Similar in general to that of *F. c. azteca*, but larger and differing otherwise in the same proportions as from *hippolestes*. Larger and more elongated than that of *F. c. californica*, with flatter frontal region and relatively less widely spreading zygomata. Approaching that of *F. c. browni* in narrowness, but decidedly larger, with heavier dentition.

Measurements.—*Skull of type* (no reliable measurements of body available): Greatest length, 216.8 mm.; zygomatic breadth, 141.6; interorbital breadth, 43.4; least width between outer walls of interpterygoid fossa, 29; alveolar length of upper canine-premolar series, 62.4; crown length of upper carnassial, 22.5.

Remarks.—The mountain lions of the Kaibab plateau north of the Grand Canyon of the Colorado River in northwestern Arizona, southwestern Utah and central and eastern Nevada, assigned to this subspecies, are closely allied to *F. c. hippolestes* which has an extended range from north to south in the Rocky Mountain region. While the differential characters are comparatively slight they are exhibited so consistently by the material examined that separate recognition by name seems necessary in order to clarify the relationships of neighboring forms.

***Felis concolor anthonyi*, subsp. nov.**

Venezuelan Puma

Type.—From Playa del Rio Base, Monte Duida, Territorio de Amazonas, southern Venezuela. No. 76935, ♂ adult, American Museum of Natural History, collected by Olalla Brothers, November 22, 1928.

General characters.—A large, short-haired, rusty reddish subspecies, with a massive skull. Similar in size to *F. c. wavula*, but type somewhat darker in general tone than specimens referred to that form, and skull differing in important details. Differing from *F. c. bangsi* and *F. c. söderstromi* in more rufescent coloration and cranial features.

Color.—*Type:* Upper surface of neck and median dorsal area to base of tail near ferruginous or hazel, moderately mixed with black especially on the rump, becoming light tawny on sides of neck, shoulders, along flanks and outer sides of limbs, paling to near light pinkish cinnamon on feet; lips, except near base of vibrissae, chin and throat white; under surface of neck suffused with light pinkish cinnamon; chest, inner sides of limbs, inguinal region, and median line of abdomen dull white; sides of abdomen invaded by irregular light tawny spots; top of head ferruginous mixed with black; face in general buffy brownish; a conspicuous black area at base of vibrissae; ears black externally, thinly clothed internally with whitish hairs; hairs around pads on feet blackish; tail above buffy brownish, with a blackish median line, below dull buffy becoming black all around at tip which is tufted.

Skull.—Size large and structure massive. Similar in general to that of *F. c. bangsi*, but much larger; interpterygoid fossa much broader; auditory bullae larger; dentition similar, but heavier. Not very unlike that of *F. c. söderstromi*, but larger; ascending branches of premaxillae ending on maxillo-nasal suture (premaxillary endings slightly deflected outward and incising maxillae in *söderstromi*); jugal reaching farther posteriorly, well into plane of glenoid fossa; auditory bullae larger; dentition similar but heavier. Compared with that of *F. c. wavula* the skull is broader; frontal region much broader; nasals more highly arched, less flattened anteriorly; ascending branches of maxillae less compressed, or "pinched in" laterally; interpterygoid fossa much broader; auditory bullae large as in *wavula*; dentition similar, but upper carnassial with internal cusp less prominent.

Measurements.—*Type:* Total length, 1720 mm.; tail vertebrae, 725; hind foot, 245. *Skull (type):* Greatest length, 205; zygomatic breadth, 143.5; interorbital breadth, 41.2; least width between outer walls of interpterygoid fossa, 33.3; alveolar length of upper canine-premolar series, 62.5; crown length of upper carnassial, 23.5.

Remarks.—Although based on a single specimen, a fine adult male, the characters presented by the type of *F. c. anthonyi* seem clearly beyond the range of individual variation in any of the forms described. From the Monte Duida region, near the upper Orinoco River, it may range into much of the upper Amazon Valley. The width of the interpterygoid fossa is remarkable and equalled in the known forms of the group only in *F. c. pearsoni* and *F. c. puma* which are widely different in other respects. This new puma is named for Mr. H. E. Anthony, Curator of Mammals, American Museum of Natural History, in recognition of his extensive explorations and research on the mammals of South America, and to whom we are indebted for the privilege of describing it.

***Felis concolor greeni*, subsp. nov.**

East Brazilian Puma

Type.—From Curraes Novos, Rio Grande do Norte, Brazil. No. 249896, ♂ adult, U. S. National Museum (Biological Survey collection), collected by Edward C. Green, November, 1930.

General characters.—A small, short-haired, rich rusty reddish subspecies, with small but robust skull and remarkably small teeth. Apparently not very closely allied to any known form. Similar in general to *Felis concolor concolor*, but much smaller, and cranial characters distinctive. Not very unlike *F. c. wavula* and *F. c. osgoodi* in color, but much smaller and skull quite different.

Color.—*Type:* Top of head, neck, and median dorsal area to base of tail rich cinnamon rufous, very thinly mixed with black, the general rufescent tone most intense along lower part of back and rump, becoming light tawny on sides of neck, shoulders, along flanks and on outer surfaces of limbs, paling gradually to near light pinkish cinnamon on feet; lips, except near base of vibrissae, chin and throat white; chest, inner sides of limbs, and inguinal region dull whitish; abdomen whitish, the sides with irregular but rather distinct light tawny spots; face in general buffy brownish; ears blackish externally, thinly clothed internally with whitish hairs; hairs around pads on feet brownish black; tail above ochraceous tawny rather heavily mixed with black along the median line, below ochraceous buffy, the tip tapering and lacking a distinct black terminal tuft.

Skull.—Skull small, short, rounded and rather heavy. Similar in general to that of *F. c. concolor*, but much smaller; frontal region actually as well as relatively broader and flatter; nasals relatively narrower, more pointed posteriorly, less decurved along median line anteriorly; interpterygoid fossa relatively narrower; auditory bullae relatively much smaller, more flattened, less inflated in front of meatus; jugal extending posteriorly to plane of glenoid fossa about as in *concolor*; dentition similar but much lighter, the individual teeth much smaller, except vestigial premolars and molars which are rather large. Compared with that of *F. c. wavula* the skull is smaller; frontal region broader; ascending branches of maxillae not compressed or "pinched in" laterally as in *wavula*; interpterygoid fossa narrower; auditory bullae smaller, less inflated anteriorly; dentition much lighter; upper carnassial with internal cusp less developed. In general form the skull somewhat resembles that of *F. c. osgoodi*, but is much smaller and differs in detail, the rostrum being less compressed laterally, the auditory bullae relatively smaller and dentition much lighter.

Measurements.—*Skull of type* (no measurements of body available): Greatest length, 189 mm.; zygomatic breadth, 132.6; interorbital breadth, 43.1; least width between outer walls of interpterygoid fossa, 26.6; alveolar length of upper canine-premolar series, 52.8; crown length of upper carnassial, 20.

Remarks.—*Felis c. greeni* from extreme eastern South America requires no very close comparison with any known form. In essential characters, however, it agrees so closely with the other subspecies that the use of a trinomial name seems fully warranted. It is readily distinguished by small size and remarkably small teeth. The canines are especially short and weak. The new form is named for the collector of the type, Mr. Edward C. Green, a collaborator of the Biological Survey for many years.